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ABSTRACT

The Semantic Relation Test (SRT) was administered to 83 undergraduate students at Hamilton College (New York) to test the extent of subjects' knowledge of different relationships between word pairs. The 60 analogy items covered five categories of relationships: antonyms, case relations, class inclusion, part-whole relations, and similars. Three different item types separated knowledge of the family component from the specific component: heterogeneous-same, heterogeneous-different, and homogeneous. Analyses of the results indicated an interaction between relation family and item type. The main effect was not significant for relations, but it was for item type. When performance on heterogeneous-same and heterogeneous-different items was compared, significant main effects were found for the kind of relation, item type, and interaction of relation and type. When Scholastic Aptitude Test (SAT) and SRT scores were correlated, verbal SAT scores were postively correlated with overall SRT. Surprisingly, SAT mathematics scores were more highly correlated than verbal SAT scores. The SRT and scoring key are appended. (GDC)

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Semantic Relation Comprehension:

Components and Correlates

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Running Head: Semantic Relations

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Abstract

The present study investigated the extent of subjects' knowledge for different semantic relations. Relation knowledge was tested by 60 analogy items. Accuracy of relation identification varied between general and specific aspects of a relation's definition and between five general classes of relations: antonyms, case relations, class inclusion, part-whole relations, and similars. Theories of relation comprehension and intellectual aptitude need to take account of the knowledge of the relation being processed.

Semantic Relation Comprehension:

Components and Correlates

Many different kinds of semantic relations occur in the English language, e.g., synonymity, subordination, and part-whole relations. Each of these relations necessarily has its own definition, which makes it distinguishable from other semantic relations (Chaffin & Herrmann, 1984). This point is illustrated in Table 1, which presents fifteen specific relations grouped into five more comprehensive families of relations.

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Insert Table 1 about here

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For example, the contrary, contradictory, and directional relations are grouped together into the more general family of family antonym relations.

Because of the hierarchical organization of relations, the definition of a specific relation may be seen as made up of two components. The family component contains the definitional specifications shared by all members of a family of relations. For example, for a relation to belong to the family of antonyms, the pair of words must be characterized by opposition. The specific component contains the definitional properties that distinguish a specific relation from other relations sharing the same family component. For example, contrary antonyms, e.g., hot-cold, are opposed on a continuous dimension, on which there are varying degrees of temperature between the two extremes, while contradictory antonyms, e.g.,

life-death, are opposed on a dichotomous dimension, and directional antonyms are opposed in space or time, e.g., left-right and before-after.

Previous research has not attempted to isolate general and specific components of relation knowledge to see if relation comprehension depends more on one component than the other. The present research had the purpose of investigating people's knowledge of the two components. The amount of knowledge of the family and specific components may differ from one family of relations to another.

To test people's knowledge of relation components, a semantic relation test (SRT) was developed composed of analogy items. Each item consisted of four word pairs, a standard and three choice pairs. The task was to select the choice pair whose relation was closest to the relation of the standard pair. Three different types of questions were used to separate knowledge of the family component from knowledge of the specific component . The three types are illustrated in Table 2 and the differences between them are summarized in Table 3.

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Insert Tables 2 and 3 about here

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In heterogeneous-same items, the correct choice is distinguished from the incorrect choices by both the family component and the specific component. For example, in item 1 in Table 3 the standard pair (inside-outside) matches the correct choice (purchase-sale) on both the family component, (antonym), and the specific component (directional). In heterogeneous-different items, the correct choice is distinguished by the family

component alone. For example, in item 2 in Table 3 the standard pair (top-bottom) matches the correct choice (life-death) on the family component (antonym) but not on the specific component (directional and contrary respectively). For homogenous items, all of the comparison pairs were from the same relation family. The correct choice was distinguished only by the specific component. For example, in item 3 in Table 3, all of the comparison pairs have the same family component (antonym) but only the standard (front-back) matches the correct choice (entrance-exit) on the specific component (directional).

Each question type on the SRT required the use of different components of relation knowledge. In order to correctly answer a heterogeneous-same item subjects could draw on knowledge of either the family or the specific component, or both. To correctly answer a heterogeneous-different item subjects could rely only on knowledge of the family component. To correctly answer a homogenous item, subjects could rely only on knowledge of the specific component .

Method

Subjects. Eighty-three undergraduate students (41 male, 42 female) of Hamilton College were paid $3.00 each for participation in the study.

Procedure:Design of the Semantic Relations Test (SRT). The SRT consisted of 60 questions. The five families of relations were each represented by 6 homogeneous (total 30), 3 heterogeneous-same (total 15) and 3 heterogeneous-different items (total 15). Each family was represented by 3 specific relations which are listed in Table 1. The specific relations each occurred twice as a standard relation in a

homogenous item and once as a standard for each type of heterogeneous item. Item types and relation families were counterbalanced across the questionnaire. Six different forms of the questionnaire were developed, which differed in the position of the items and of the correct responses for each item. The pairs selected for each question were approximately equal in frequency, concreteness, and level of affect. All words were nouns and were fairly common (a frequency of 19 or greater in the Kucera & Francis (1967) frequency norms). The appendix contains a copy of the SRT together with scoring instructions, a list of items classified by relation and item type, a scoring key, a key of specific relations, a key for computing subscores, and a score sheet.

Administration of the SRT. The test was administered to groups of approximately 20 people. Subjects were instructed to complete each item on the test by circling the comparison pair that held the relation closest to that of the standard pair. Subjects took about 30 minutes to finish.

Results

Figure 1 presents the mean percent correct relation identifications for the three question types for the five relation families. The analysis compared first the difference between families for the heterogeneous items and the homogeneous items, in analyses in which both subject and item variance were random factors (Clark, 1973). Relation family and item-type interacted, F_{min} (4,54) = 4.98; $p < 0.005$. The main effect for relations was not significant, F_{min} (1,54) = 1.49; the main effect for item type was significant, F_{min} (1,54) = 5.45, $p < 0.025$. A separate analysis of variance was performed on the heterogeneous items to compare performance on

heterogeneous-same and heterogeneous-different items. Significant main effects were found for the kind of relation, $F(4,328) = 105.91$; $p < 0.0001$, item type, $F(1,82) = 106.73$; $p < 0.0001$, and for the interaction of relation and type, $F(4,328) = 42.75$; $p < 0.0001$.

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Insert Figure 1 about here

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In additional analysis, college aptitude test scores (the Scholastic Aptitude Test, SAT) were correlated with the SRT. The correlations are shown in Table 4. Verbal SAT scores were positively correlated with the SRT overall score and with the score for the class inclusion items. Math SAT scores were, surprisingly, more highly correlated than verbal SAT with performance on the SRT, both overall and for three relation families: antonyms, case relations, and class inclusion.

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Insert Table 4 about here

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Discussion

The findings suggest that relations differ in the knowledge that people have of their family and specific components. For the antonym family accuracy was high for the two kinds of heterogeneous item and at chance level for homogenous items. Heterogeneous items involve the family component; homogenous items only the specific component. Thus the family

component was accurately distinguished, i.e., antonyms are easily distinguished from the other families of relations, but, subjects could not identify the specific component, i.e., subjects could not distinguish particular kinds of antonym relations. These results are not surprising. Antonyms are the most distinctive of the relation families (Chaffin & Herrmann, 1984) but most people are not familiar with the names of different types of antonymy, e.g., contraries and contradictories.

The part-whole family showed a similar pattern to the antonym family; accuracy was higher for heterogeneous than for homogenous items. Unlike the antonym relations, accuracy for the homogenous items was well above chance. This pattern of results indicates that the family component was more readily distinguished than the specific component, but that subjects had knowledge of both. Unlike antonym relations the specific components of part-whole relations are reflected in numerous common terms for various part-whole relations, e.g., "section, member, portion, piece". Familiarity with these relational concepts may account for subjects' accuracy on the homogenous part-whole items.

The pattern for case relations was similar to that for the part-whole family except that the difference between homogenous and heterogeneous items was smaller. The family and specific components were equally distinct.

The pattern of results for class inclusion was quite different. Accuracy was lowest for the heterogeneous-different items which depend on the family component, and higher and approximately equal for heterogeneous-same and homogenous items which both involve the specific

component. The family component for class inclusion was not readily recognized. This may be because the coordinate (e.g., table-chair) and collateral (e.g., vegetable-apple) relations were used. These require the generation of a superordinate (furniture and fruit respectively); if the superordinate is not generated, the two words may be seen as similars.

For the similarity relations accuracy was low for both heterogeneous-different and homogeneous items; performance was good only for the heterogeneous-same items for which knowledge of both family and specific components can be used together. This may be due to the fact that similarity is characteristic of most relation families. The family elements for similarity may, therefore, be hard to distinguish from those of other relation families except when other specific elements are present.

In summary, for each item type there was a different pattern of accuracy across the five relation families. Knowledge of relation components does not, then, follow the same pattern for all relations (cf. Riegel & Riegel, 1963; Perfetti, 1967).

The results indicated, as would be expected, that ability to identify semantic relations (measured by the SRT) was related to college aptitude (measured by the SAT). It was unexpected that scores on the math SAT were more highly correlated with performance on the SRT than were verbal SAT scores. Possibly the SAT verbal score is affected by word frequency which was not a factor for the SRT since all words were of fairly high frequency. Identification of relations is a logical process that resembles some of the problem solution activities required by problems in the math SAT. It is

also unclear why verbal SAT scores were most highly correlated with accuracy on class inclusion items of the SRT.

The present findings have implications for theories of relation comprehension and intellectual aptitude. Understanding of a relation apparently requires two levels of relation knowledge, family and specific. The degree of knowledge of one component is not necessarily related to the degree of knowledge of the other. Since component knowledge varies over individuals, it should be possible to assess this variation and to train people selectively on those components of relation knowledge that need improvement.

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Author's Note

This work was reported at the meeting of the Eastern Psychological Association, Baltimore, 1984. A shorter version of this article was published in Portuguese in Conhecer a Ressoa, 1985, 3, 9-17, published by Centro de Psicologia Clinica. Copies of this article and of the SRT can be obtained from Dr. D. J. Herrmann, Department of Psychology, Hamilton College, Clinton, NY 08625.

Table 1

The Hierarchical Organization of Semantic Relations

Antonyms	Case	Class Inclusion	Part	Similars
Contrary	Agent/Object	Superordinate	Functional	Synonyms
(night-day)	(soldier-enemy)	(vehicle-car)	(car-engine)	(car-auto)
Contradictory	Agent/Instrument	Coordinate	Membership	Attribute
(life-death)	(soldier-weapon)	(car-truck)	(singer-choir)	(fork-rake)
Directional	Instrument/Object	Collateral	Functional location	Dimensional similars
(front-back)	(weapon-enemy)	(car-house)	(house-kitchen)	(smile-laugh)

Table 2

Examples of Three Types of Items from the Semantic Relations Test

	Item Type	Target Pair	Choice Pairs		
1.	Heterogeneous-same	inside outside	hammer nail	upstairs downstairs	wheel bicycle
2.	Heterogeneous-different	top bottom	office desk	vegetable apple	life death
3.	Homogenous	front back	entrance exit	absence presence	poverty wealth

Table 3

Family and Specific Components of Relation Definitions for Three Types of SRT Items

		Components	
		Family	Specific
Item #1: (Heterogeneous-same. Family + Specific components match.)			
Target	Inside-Outside	Antonym	Directional
Choices	Hammer-Nail	Case	Instrument/Object
	Upstairs-Downstairs	Antonym	Directional
	Wheel-Car	Part-whole	Functional
Item #2: (Heterogeneous-different. Family components match.)			
Target	Top-Bottom	Antonym	Directional
Choices	Office-Desk	Part-whole	Locational
	Vegetable-Apple	Class inclusion	Collateral
	Life-Death	Antonym	Contradictory
Item #3: (Homogenous. Specific components match.)			
Target	Front-Back	Antonym	Directional
Choices	Entrance-Exit	Antonym	Directional
	Absence-Presence	Antonym	Contradictory
	Poverty-Wealth	Antonym	Contrary

Underline indicates target pair, correct choice, and the components on which they match.

Table 4

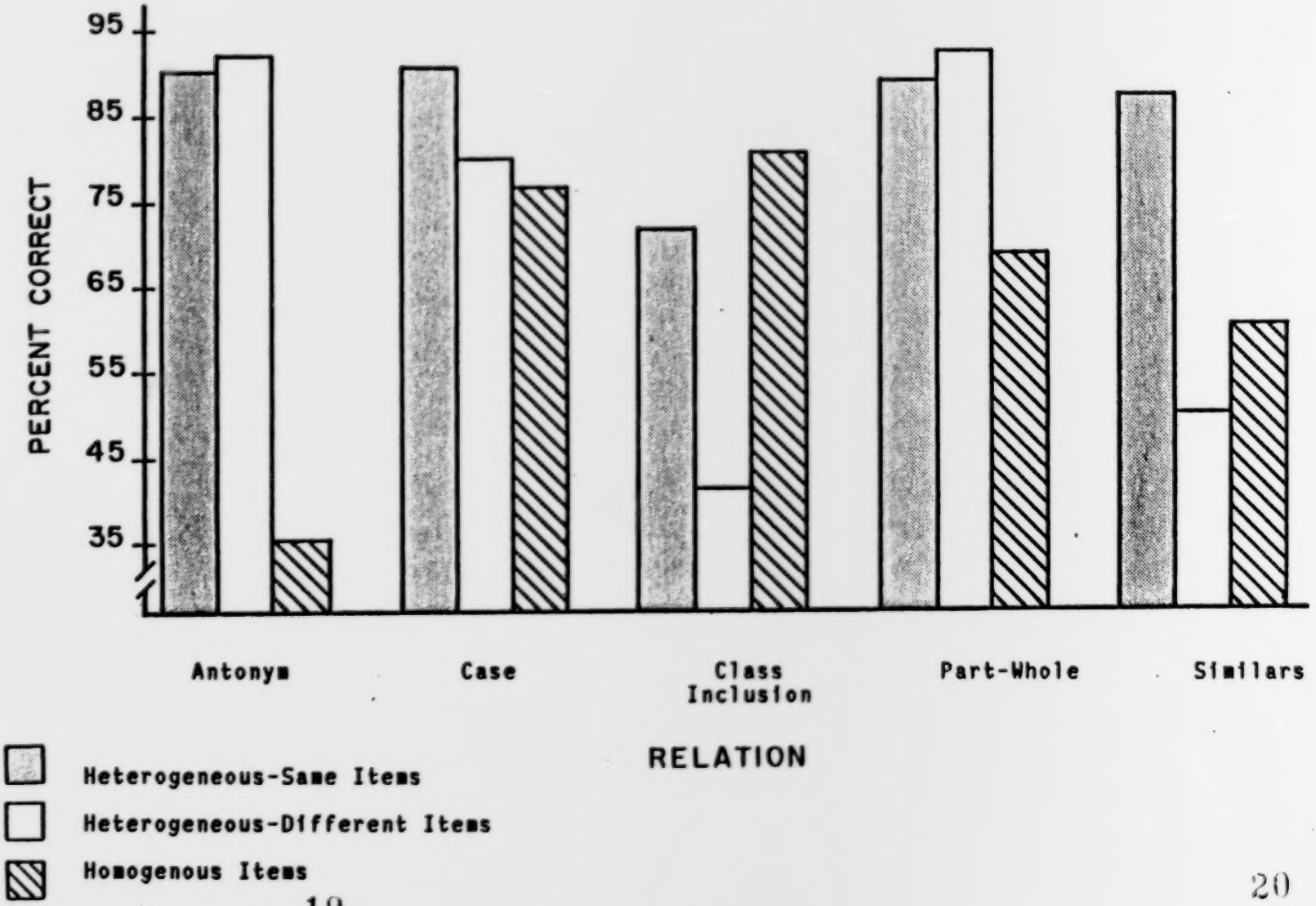
Pearson Correlation Coefficients for Verbal and Math SAT Scores with SRT Subscores by Relation and Item-type

ITEM TYPE	RELATION				
	Antonym	Case	Class Inclusion	Part	Similar
HOMOGENOUS					
Math SAT	.156	.256*	.328*	-.019	.242*
Verbal SAT	.034	.163	.079	.082	.204
HETEROGENEOUS-SAME					
Math SAT	.149	.139	.217*	.007	-.172
Verbal SAT	.037	.087	.237*	.004	-.160
HETEROGENEOUS-DIFFERENT					
Math SAT	.087	.153	.021	.183*	.028
Verbal SAT	.006	.015	.166	.068	.161
ALL ITEM TYPES					
Math SAT	.237*	.333*	.337*	.047	.127
Verbal SAT	.049	.169	.263*	.089	.177
TOTAL SCORE					
Math	.385*				
Verbal	.270*				

df = 81
r = .183, p < .05
r = .256, p < .01

Figure Caption

Figure 1. Percent correct identifications as a function of Relation and Item Types.


95
85
75
65
55
45
35
PERCENT CORRECT
Antonym
Case
Class Inclusion
Part-Whole
Similars
RELATION
Heterogeneous-Same Items
Heterogeneous-Different Items
Homogenous Items

APPENDIX

Semantic Relations Test: Form 1

Name _____ Age _____ Sex _____

Major or Intended Major _____ Preferred hand _____

This test is part of a research project that is studying how people perceive relatedness among words. The test consists of 60 questions. In each question, you will be presented with four pairs of words. Your task will be to determine which of the three pairs of words on the right best represents the relationship between the first pair and to circle the best answer.

For example, you might see:

girl	jacket	fertility	season
boy	coat	sterility	fall

The appropriate answer is "fertility,sterility", because the relation between those two words is the most similar to the relation between "girl" and "boy." Here are a few more examples:

science	liquid	mug	similarity
biology	lemonade	handle	difference

Here, the appropriate answer is "liquid,lemonade".

response	needle	ham	task
answer	tower	salami	job

The correct response would be "task,job", because the relation between "task" and "job" is the most similar to the relation between "response" and "answer".

When you are ready, please turn the page and complete the test.

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fireman	mechanic	tool	stream
hose	engine	strainer	crayfish
door	rope	launch	bed
knob	vine	landing	mattress
policeman	razor	farmer	whip
victim	beard	grain	lion
sport	vacuum	occupation	guitar
photography	carpet	bigot	string
watermelon	sentence	crew	restaurant
seed	verb	stewardess	menu
valley	universe	teacher	tree
gutter	galaxy	instructor	oak
measles	vegetable	reptile	lipstick
mumps	carrot	cateroillar	mascara
ball	discomfort	lamp	balance
orange	pain	sun	scale
exportation	purchase	axe	shoe
importation	sale	log	sole
front	life	night	left
back	death	day	right

pool	writer	color	hand
water	novel	blue	finger
seamstress	doctor	arrival	radio
needle	stethoscope	departure	dial
Senate	skin	song	orchestra
senator	cell	melody	conductor
bird	game	donut	stable
moth	chess	collar	horse
mirror	key	painting	yard
lake	lock	movie	grass
designer	spatula	electrician	judge
fabric	egg	circuit	gavel
inside	light	country	office
outside	darkness	Georgia	desk
art	month	language	corporation
tennis	June	French	Harvard
thread	excitement	hunch	computer
wire	passion	conclusion	brain
deposit	happiness	delivery	flood
withdrawal	sadness	receipt	drought

war	camera	north	secretary
peace	eye	south	typewriter
golf	animal	existence	baker
swimming	tulip	nothingness	bread
referee	rancher	biologist	producer
whistle	steer	microscope	movie
flower	anger	hat	dance
rose	anxiety	tie	waltz
class	wage	telescope	kitchen
student	salary	stars	refrigerator
command	beginning	middle	government
order	end	center	Chrysler
hunger	parcel	debate	disaster
starvation	package	quarrel	catastrophe
barn	cast	band	shelf
cow	actor	drummer	dictionary
sculptor	king	profit	couple
clay	realm	loss	pair
truth	absence	approach	upstairs
falsehood	presence	avoidance	downstairs

poverty	simplicity	dish	criminal
wealth	complexity	plate	thief
infant	press	smile	righteousness
baby	reporter	laugh	sin
lounge	choir	necklace	drawer
sofa	soprano	clasp	sock
intelligence	innocence	acceptance	entrance
stupidity	guilt	rejection	exit
clippers	blender	gardener	weightlifter
hedge	milkshake	hoe	dumbbell
projector	tunnel	clergy	artist
screen	barrel	priest	paintbrush
garage	friend	child	wallet
car	enemy	toy	money
hurricane	rabbit	appliance	dessert
tornado	skunk	sedan	tomato
pail	cottage	perspiration	tent
bucket	mansion	sweat	awning
city	east	music	corner
Chicago	west	jazz	angle

doubt	ankle	original	anchorman
certainty	wrist	copy	news
singer	gambler	hammer	carpenter
microphone	dice	nail	lumber
remedy	triumph	rug	tailor
cure	defeat	blanket	suit
wrench	trout	jail	barber
screwdriver	salmon	prison	comb
team	plant	airport	faculty
player	leaf	plane	professor
slavery	offense	failure	top
freedom	defense	success	bottom
architect	fire	elevator	pencil
building	blaze	stairway	paper
breeze	disappointment	shrub	rake
gale	anguish	bush	fork
furniture	uncle	metal	beverage
chair	cousin	iron	popcorn
club	son	state	staff
member	daughter	Albany	typist

bicycle	desire	fraternity	knife
wheel	obsession	brother	spoon
beauty	blindness	silence	health
ugliness	sight	noise	sickness
ocean	television	foot	judgement
sea	window	crutch	decision
tractor	book	man	nation
field	degree	woman	England
disease	Christmas	emotion	fruit
sprain	Easter	sorrow	lettuce
truck	port	leg	closet
brake	ship	muscle	clothes
future	fact	community	idea
past	fiction	resident	hypothesis
dishonesty	drizzle	kidney	boxer
treachery	downpour	spleen	glove
mop	mailman	soldier	scissors
floor	letter	gun	hair
flavor	cannon	troupe	timidity
chocolate	grenade	dancer	bravery

Scoring Instructions for the Semantic Relations Test (SRT)

The SRT tests relation knowledge for five general relations (antonymy, case relations, class inclusion, part-whole relations, and similars) with three kinds of test items. The five general relations are each represented by three specific relations, e.g. antonymy is represented by contrary, contradictory, and directional antonyms. All items consist of four pairs of words: a standard and three choices. The task is to select the pair whose relation most clearly matches the relation of the standard pair.

Homogeneous items consist of four pairs representing the same general relation. The correct choice is the same specific relation as the standard pair. The two incorrect choices are other specific relations of the same general relation type as the standard. For heterogeneous items the two incorrect choices are relations of a general relation type that is different from the standard. For heterogeneous-same items the correct choice is the same specific relation as the standard pair. For heterogeneous-different items the correct choice is of the same general relation as the standard relation, but is a different specific relation. Table 1 lists all of the items by item type on the SRT.

The answer key, presented in Table 2 indicates the correct answer for each on the standard form of the SRT (form Q1). For each item the position of the correct choice, left (L), center (C), or right (R) is given in the rightmost column. In the leftmost column each item is identified by the general relation of the standard pair (antonym [A], case relation [C], class inclusion [I], part-whole [P], and similar [S]) and by item type (homogeneous [W], heterogeneous-same [HS], or heterogeneous-different [HD]). The general relation and the specific relation of the target and the three choices are indicated in the central four columns. The three specific relations representing each specific relation are indicated by the numbers "1," "2," and "3". Table 3 lists the specific relations corresponding to the letter-number codes in the target and choices columns of Tables 1 and 2.

Since the SRT tests five relations with three item types, the test yields sub-scores for 15 relation-by-item conditions. A sub-score key which lists the item numbers on the Q1 form of the SRT contributing to each of the 15 subscores is presented in Table 4; this form may be used to record a subject's answers and to calculate subscores. Table 5 provides a form to record a subject's item type scores and other summary statistics.

Table 1

SRT items according to relation class and item type

	STANDARD	CORRECT	INCORRECT 1	INCORRECT 2
ANTONYM-HOMOGENEOUS RELATION	front	left	life	night
	back	right	death	day
	A3	A3	A2	A1
	deposit	delivery	happiness	flood
	withdrawal	receipt	sadness	drought
	A3	A3	A1	A1
	truth	absence	approach	upstairs
	falsehood	presence	avoidance	downstairs
	A2	A2	A3	A3
	intelligence	acceptance	innocence	entrance
	stupidity	rejection	guilt	exit
	A1	A1	A2	A3
	slavery	offense	failure	top
	freedom	defense	success	bottom
	A2	A2	A1	A3
	beauty	silence	blindness	health
	ugliness	noise	sight	sickness
	A1	A1	A2	A2
ANTONYMS-HETEROGENEOUS (SAME)	exportation	purchase	axe	shoe
	importation	sale	log	sole
	A3	A3	C2	P1
	poverty	simplicity	dish	criminal
	wealth	complexity	plate	thief
	A1	A1	S1	I1
	doubt	original	ankle	anchorman
	certainty	copy	wrist	news
	A2	A2	I2	C1
ANTONYM-HETEROGENEOUS (DIFFERENT)	inside	light	country	office
	outside	darkness	Georgia	desk
	A3	A1	I3	P3
	war	north	camera	secretary
	peace	south	eye	typewriter
	A2	A3	S3	C3
	future	fact	community	idea

	past A1	fiction A2	resident P2	hypothesis S2
CASE- HOMOGENEOUS	policeman victim C1	farmer grain C1	razor beard C2	whip lion C2
	designer fabric C1	electrician circuit C1	spatula egg C2	judge gavel C3
	referee whistle C3	biologist microscope C3	rancher steer C1	producer movie C1
	clippers hedge C2	blender milkshake C2	gardener hoe C3	weightlifter dumbbell C3
	singer microphone C3	gambler dice C3	hammer nail C2	carpenter lumber C1
	mop floor C2	scissors hair C2	mailman letter C1	soldier gun C3
CASE- HETEROGENEOUS (SAME)	seamstress needle C3	doctor stethoscope C3	arrival departure A3	radio dial P1
	sculptor clay C1	king realm C1	profit loss A1	couple pair S1
	tractor field C2	book degree C2	man woman A2	nation England I1
CASE- HETEROGENEOUS (DIFFERENT)	fireman hose C3	mechanic engine C1	tool strainer I3	stream crayfish P3
	projector screen C2	artist paintbrush C3	tunnel barrel S3	clergy priest P2
	architect building C1	pencil paper C2	fire blaze S2	elevator stairway I2
CLASS- HOMOGENEOUS	measles mumps I2	lipstick mascara I2	vegetable carrot I1	reptile caterpillar I3
	art tennis I3	corporation Harvard I3	month June I1	language French I1

	flower	dance	anger	hat
	rose	waltz	anxiety	tie
	I1	I1	I2	I2
	hurricane	rabbit	appliance	dessert
	tornado	skunk	sedan	tomato
	I2	I2	I3	I3
	furniture	metal	uncle	beverage
	chair	iron	cousin	popcorn
	I1	I1	I2	I3
	disease	fruit	Christmas	emotion
	sprain	lettuce	Easter	sorrow
	I3	I3	I2	I1
CLASS-HETEROGENEOUS (SAME)	sport	occupation	vacuum	guitar
	photography	bigot	carpet	string
	I3	I3	C2	P1
	city	music	east	corner
	Chicago	jazz	west	angle
	I1	I1	A3	S2
	wrench	trout	jail	barber
	screwdriver	salmon	prison	comb
	I2	I2	S1	C3
CLASS-HETEROGENEOUS (DIFFERENT)	bird	game	donut	stable
	moth	chess	collar	horse
	I3	I1	S3	P3
	golf	animal	existence	baker
	swimming	tulip	nothingness	bread
	I2	I3	A2	C1
	flavor	cannon	troupe	timidity
	chocolate	grenade	cancer	bravery
	I1	I2	P2	A1
PART-HOMOGENEOUS	watermelon	sentence	crew	restaurant
	seed	verb	stewardess	menu
	P1	P1	P2	P3
	Senate	orchestra	skin	song
	senator	conductor	cell	melody
	P2	P2	P1	P1
	barn	shelf	cast	band
	cow	dictionary	actor	drummer
	P3	P3	P2	P2
	lounge	drawer	choir	necklace
	sofa	sock	soprano	clasp
	P3	P3	P2	P1
	team	faculty	plant	airport

	player P2	professor P2	leaf P1	plane P3
	truck brake P1	leg muscle P1	port ship P3	closet clothes P3
PART-HETEROGENEOUS (SAME)	door knob P1	bed mattress P1	rope vine S3	launch landing A3
	garage car P3	wallet money P3	friend enemy A1	child toy C3
	club member P2	staff typist P2	son daughter A2	state Albany I3
PART-HETEROGENEOUS (DIFFERENT)	pool water P3	hand finger P1	writer novel C1	color blue I1
	class student P2	kitchen refrigerator P3	wage salary S1	telescope stars C2
	bicycle wheel P1	fraternity brother P2	desire obsession S2	knife spoon I2
SIMILARS-HOMOGENEOUS	ball orange S3	lamp sun S3	discomfort pain S2	balance scale S1
	thread wire S3	computer brain S3	excitement passion S2	hunch conclusion S2
	hunger starvation S2	debate quarrel S2	parcel package S1	disaster catastrophe S1
	pail bucket S1	perspiration sweat S1	cottage mansion S2	tent awning S3
	breeze gale S2	disappointment anguish S2	shrub bush S1	rake fork S3
	ocean sea S1	judgement decision S1	television window S3	foot crutch S3
SIMILARS-HETEROGENEOUS (SAME)	mirror lake S3	painting movie S3	key lock C2	yard grass P3

	command order S1	middle center S1	beginning end A3	government Chrysler I3
	dishonesty treachery S2	drizzle downpour S2	kidney spleen I2	boxer glove C3
SIMILAR-HETEROGENEOUS (DIFFERENT)	valley gutter S3	teacher instructor S1	universe galaxy I1	tree oak P1
	infant baby S1	smile laugh S2	press reporter P2	righteousness sin A2
	remedy cure S2	rug blanket S3	triumph defeat A1	tailor suit C1

Table 2

Semantic Relations Test
Key of Correct Answers: Form Q1

	ITEM TYPE	TARGET	CHOICES L	C	R	CORRECT
1	C Het D	C3	C1	I3	P3	L
2	P Het S	P1	S3	A3	P1	R
3	C Hom	C1	C2	C2	C2	C
4	I Het S	I3	C2	I3	P1	C
5	P Hom	P1	P1	P2	P3	L
6	S Het D	S3	I1	S1	P1	C
7	I Hom	I2	I1	I3	I2	R
8	S Hom	S3	S2	S3	S1	C
9	A Het S	A3	A3	C2	P1	L
10	A Hom	A3	A2	A1	A3	R
11	P Het D	P3	C1	I1	P1	R
12	C Het S	C3	C3	A3	P1	L
13	P Hom	P2	P1	P1	P2	R
14	I Het D	I3	I1	S3	P3	L
15	S Het S	S3	C2	S3	P3	C
16	C Hom	C1	C2	C1	C3	C
17	A Het D	A3	A1	I3	P3	L
18	I Hom	I3	I1	I1	I3	R
19	S Hom	S3	S2	S2	S3	R
20	A Hom	A3	A1	A3	A1	C
21	A Het D	A2	S3	A3	C3	C
22	I Het D	I2	I3	A2	C1	L
23	C Hom	C3	C1	C3	C1	C
24	I Hom	I1	I2	I2	I1	R
25	P Het D	P2	S1	C2	P3	R
26	S Het S	S1	A3	S1	I3	C
27	S Hom	S2	S1	S2	S1	C
28	P Hom	P3	P2	P2	P3	R
29	C Het S	C1	C1	A1	S1	L
30	A Hom	A2	A2	A3	A3	L
31	A Het S	A1	A1	S1	I1	L
32	S Het D	S1	P2	S2	A2	C
33	P Hom	P3	P2	P1	P3	R
34	A Hom	A1	A2	A1	A3	C
35	C Hom	C2	C2	C3	C3	L
36	C Het D.	C2	S3	P2	C3	R
37	P Het S	P3	A1	C3	P3	R
38	I Hom	I2	I2	I3	I3	L
39	S Hom	S1	S2	S1	S3	C
40	I Het S	I1	A3	I1	S2	C
41	A Het S	A2	I2	A2	C1	C
42	C Hom	C3	C3	C2	C1	L
43	S Het D	S2	A1	S3	C1	C
44	I Het S	I2	I2	S1	C3	L
45	P Hom	P2	P1	P3	P2	R
46	A Hom	A2	A2	A1	A3	L
47	C Het D	C1	S2	I2	C2	R

	ITEM TYPE	TARGET	L	C	R	CORRECT
48	S Hom	S2	S2	S1	S3	L
49	I Hom	I1	I1	I1	I3	C
50	P Het S	P2	A2	I3	P2	R
51	P Het D	P1	S2	P2	I2	C
52	A Hom	A1	A2	A1	A2	C
53	S Hom	S1	S3	S3	S1	R
54	C Het S	C2	C2	A2	I1	L
55	I Hom	I3	I2	I1	I3	R
56	P Hom	P1	P3	P1	P3	C
57	A Het D	A1	A2	P2	S2	L
58	S Het S	S2	S2	I2	C3	L
59	C Hom	C2	C1	C3	C2	R
60	I Het D	I1	I2	P2	A1	L

General Relations:
A Antonym
I Class Inclusion
S Similar
C Case relation
P Part-whole

Item Types:
Het S Heterogeneous-same
Het D Heterogeneous-different
Hom Within

Table 3

Key to Specific Relations on the SRT

General and Specific Relations
Antonyms
Contrary (A_1)
Contradictory (A_2)
Directional (A_3)
Case Relations (C)
Agent-Object (C_1)
Agent-Recipient (C_2)
Agent-Instrument (C_3)
Categorical Relation
Subordination (CR_1)
Co-ordination (CR_2)
Colaterals (CR_3)
Part-Whole Inclusion
Functional Object (P_1)
Functional Location (P_2)
Membership (P_3)

Similars

Synonyms (S_1)

Dimensional Similars

Attribute Similars

Table 4

Scoring Key for SRT Subscores as Defined by General Relation and Item Type

Item Type	
Antonymy homogeneous:	10,10,30,34,46,52
heterogeneous same:	9,31,41
heterogeneous different:	17,21,57
Case Relations homogeneous:	3,16,23,35,42,59
heterogeneous same:	12,29,54
heterogeneous different:	1,36,47
Class Inclusion homogeneous:	7,18,24,38,49,55
heterogeneous same:	4,40,44
heterogeneous different:	14,22,60
Part-Whole Inclusion homogeneous:	5,13,28,33,45,56
heterogeneous same:	2,37,50
heterogeneous different:	11,25,51

Similars homogeneous: 8,19,27,39,48,53----------

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heterogeneous same: 15,26,58----------

heterogeneous different: 6,32,43----------

Subscore Calculation

Subscores are calculated simply by counting the number of correct respones for each of the 15 item types listed above. The number correct may then be entered in a subject's SRT Score Sheet on the next page.

Table 5

SRT Score Sheet

Name_____ Age_____ Sex_____

Item Type	Antonymy	Relations: Case Relations	Relations: Class Inclusion	Relations: Part-Whole Inclusion	Similars
Homogeneous					
Heterogeneous-same					
Heterogeneous-different					
Heterogeneous					
Overall					